SEQUENCE LISTING

<110> Shaw , Jei-Fu
Lai, Chia-Ping

<120> PLANT TUBBY-LIKE PROTEINS

<130> 08919-099001

<140> US 10/763,042
<141> 2004-01-21

<150> US 60/441,380
<151> 2004-01-21

<160> 51

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 450
<212> PRT
<213> Arabidopsis sp.

<400> 1

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Met Ser Phe Arg Ser Ile Val Arg Asp Val Arg Asp Ser Ile Gly Ser
 1               5                  10                  15
Leu Ser Arg Arg Ser Phe Asp Phe Lys Leu Ser Ser Leu Asn Lys Glu
            20                  25                  30
Gly Gly Lys Ser Arg Gly Ser Val Gln Asp Ser His Glu Glu Gln Leu
        35                  40                  45
Val Val Thr Ile Gln Glu Thr Pro Trp Ala Asn Leu Pro Pro Glu Leu
    50                  55                  60
Leu Arg Asp Val Ile Lys Arg Leu Glu Glu Ser Glu Ser Val Trp Pro
65                  70                  75                  80
Ala Arg Arg His Val Val Ala Cys Ala Ser Val Cys Arg Ser Trp Arg
                85                  90                  95
Asp Met Cys Lys Glu Ile Val Gln Ser Pro Glu Leu Ser Gly Lys Ile
            100                 105                 110
Thr Phe Pro Val Ser Leu Lys Gln Pro Gly Pro Arg Asp Ala Thr Met
        115                 120                 125
Gln Cys Phe Ile Lys Arg Asp Lys Ser Asn Leu Thr Tyr His Leu Tyr
    130                 135                 140
Leu Cys Leu Ser Pro Ala Leu Leu Val Glu Asn Gly Lys Phe Leu Leu
145                 150                 155                 160
Ser Ala Lys Arg Ile Arg Arg Thr Thr Tyr Thr Glu Tyr Val Ile Ser
                165                 170                 175
Met His Ala Asp Thr Ile Ser Arg Ser Ser Asn Thr Tyr Ile Gly Lys
            180                 185                 190
Ile Arg Ser Asn Phe Leu Gly Thr Lys Phe Ile Ile Tyr Asp Thr Gln
        195                 200                 205
Pro Ala Tyr Asn Ser Asn Ile Ala Arg Ala Val Gln Pro Val Gly Leu
    210                 215                 220
Ser Arg Arg Phe Tyr Ser Lys Arg Val Ser Pro Lys Val Pro Ser Gly
```

225 230 235 240
Ser Tyr Lys Ile Ala Gln Val Ser Tyr Glu Leu Asn Val Leu Gly Thr
245 250 255
Arg Gly Pro Arg Arg Met His Cys Ala Met Asn Ser Ile Pro Ala Ser
260 265 270
Ser Leu Ala Glu Gly Gly Thr Val Pro Gly Gln Pro Asp Ile Ile Val
275 280 285
Pro Arg Ser Ile Leu Asp Glu Ser Phe Arg Ser Ile Thr Ser Ser Ser
290 295 300
Ser Arg Lys Ile Thr Tyr Asp Tyr Ser Asn Asp Phe Ser Ser Ala Arg
305 310 315 320
Phe Ser Asp Ile Leu Gly Pro Leu Ser Glu Asp Gln Glu Val Val Leu
325 330 335
Glu Glu Gly Lys Glu Arg Asn Ser Pro Pro Leu Val Leu Lys Asn Lys
340 345 350
Pro Pro Arg Trp His Glu Gln Leu Gln Cys Trp Cys Leu Asn Phe Arg
355 360 365
Gly Arg Val Thr Val Ala Ser Val Lys Asn Phe Gln Leu Ile Ala Ala
370 375 380
Asn Gln Pro Gln Pro Gln Pro Gln Pro Gln Pro Gln Pro Gln Pro Leu
385 390 395 400
Thr Gln Pro Gln Pro Ser Gly Gln Thr Asp Gly Pro Asp Lys Ile Ile
405 410 415
Leu Gln Phe Gly Lys Val Gly Lys Asp Met Phe Thr Met Asp Phe Arg
420 425 430
Tyr Pro Leu Ser Ala Phe Gln Ala Phe Ala Ile Cys Leu Ser Ser Phe
435 440 445
Asp Thr
450

<210> 2
<211> 394
<212> PRT
<213> Arabidopsis sp.

<400> 2
Met Ser Leu Lys Ser Ile Leu Arg Asp Leu Lys Glu Val Arg Asp Gly
1 5 10 15
Leu Gly Gly Ile Ser Lys Arg Ser Trp Ser Lys Ser Ser His Ile Ala
20 25 30
Pro Asp Gln Thr Thr Pro Pro Leu Asp Asn Ile Pro Gln Ser Pro Trp
35 40 45
Ala Ser Leu Pro Pro Glu Leu Leu His Asp Ile Ile Trp Arg Val Glu
50 55 60
Glu Ser Glu Thr Ala Trp Pro Ala Arg Ala Ala Val Val Ser Cys Ala
65 70 75 80
Ser Val Cys Lys Ser Trp Arg Gly Ile Thr Met Glu Ile Val Arg Ile
85 90 95
Pro Glu Gln Cys Gly Lys Leu Thr Phe Pro Ile Ser Leu Lys Gln Pro
100 105 110
Gly Pro Arg Asp Ser Pro Ile Gln Cys Phe Ile Lys Arg Asn Arg Ala
115 120 125
Thr Ala Thr Tyr Ile Leu Tyr Tyr Gly Leu Met Pro Ser Glu Thr Glu
130 135 140
Asn Asp Lys Leu Leu Leu Ala Ala Arg Arg Ile Arg Arg Ala Thr Cys
145 150 155 160
Thr Asp Phe Ile Ile Ser Leu Ser Ala Lys Asn Phe Ser Arg Ser Ser

```
                165                 170                 175
Ser Thr Tyr Val Gly Lys Leu Arg Ser Gly Phe Leu Gly Thr Lys Phe
            180                 185                 190
Thr Ile Tyr Asp Asn Gln Thr Ala Ser Ser Thr Ala Gln Ala Gln Pro
        195                 200                 205
Asn Arg Arg Leu His Pro Lys Gln Ala Ala Pro Lys Leu Pro Thr Asn
    210                 215                 220
Ser Ser Thr Val Gly Asn Ile Thr Tyr Glu Leu Asn Val Leu Arg Thr
225                 230                 235                 240
Arg Gly Pro Arg Arg Met His Cys Ala Met Asp Ser Ile Pro Leu Ser
                245                 250                 255
Ser Val Ile Ala Glu Pro Ser Val Val Gln Gly Ile Glu Glu Glu Val
            260                 265                 270
Ser Ser Ser Pro Ser Pro Lys Gly Glu Thr Ile Thr Thr Asp Lys Glu
        275                 280                 285
Ile Pro Asp Asn Ser Pro Ser Leu Arg Asp Gln Pro Leu Val Leu Lys
    290                 295                 300
Asn Lys Ser Pro Arg Trp His Glu Gln Leu Gln Cys Trp Cys Leu Asn
305                 310                 315                 320
Phe Lys Gly Arg Val Thr Val Ala Ser Val Lys Asn Phe Gln Leu Val
                325                 330                 335
Ala Glu Ile Asp Ala Ser Leu Asp Ala Pro Pro Glu Glu His Glu Arg
            340                 345                 350
Val Ile Leu Gln Phe Gly Lys Ile Gly Lys Asp Ile Phe Thr Met Asp
        355                 360                 365
Tyr Arg Tyr Pro Leu Ser Ala Phe Gln Ala Phe Ala Ile Cys Ile Ser
    370                 375                 380
Ser Phe Asp Thr Lys Pro Ala Cys Glu Gly
385                 390

<210> 3
<211> 406
<212> PRT
<213> Arabidopsis sp.

<400> 3
Met Ser Phe Lys Ser Leu Ile Gln Asp Met Arg Gly Glu Leu Gly Ser
 1               5                  10                  15
Ile Ser Arg Lys Gly Phe Asp Val Arg Phe Gly Tyr Gly Arg Ser Arg
            20                  25                  30
Ser Gln Arg Val Val Gln Asp Thr Ser Val Pro Val Asp Ala Phe Lys
        35                  40                  45
Gln Ser Cys Trp Ala Ser Met Pro Pro Glu Leu Leu Arg Asp Val Leu
    50                  55                  60
Met Arg Ile Glu Gln Ser Glu Asp Thr Trp Pro Ser Arg Lys Asn Val
65                  70                  75                  80
Val Ser Cys Ala Gly Val Cys Arg Asn Trp Arg Glu Ile Val Lys Glu
                85                  90                  95
Ile Val Arg Val Pro Glu Leu Ser Ser Lys Leu Thr Phe Pro Ile Ser
            100                 105                 110
Leu Lys Gln Pro Gly Pro Arg Gly Ser Leu Val Gln Cys Tyr Ile Met
        115                 120                 125
Arg Asn Arg Ser Asn Gln Thr Tyr Tyr Leu Tyr Leu Gly Leu Asn Gln
    130                 135                 140
Ala Ala Ser Asn Asp Asp Gly Lys Phe Leu Leu Ala Ala Lys Arg Phe
145                 150                 155                 160
Arg Arg Pro Thr Cys Thr Asp Tyr Ile Ile Ser Leu Asn Cys Asp Asp
```

```
                165                 170                 175
Val Ser Arg Gly Ser Asn Thr Tyr Ile Gly Lys Leu Arg Ser Asn Phe
            180                 185                 190
Leu Gly Thr Lys Phe Thr Val Tyr Asp Ala Gln Pro Thr Asn Pro Gly
        195                 200                 205
Thr Gln Val Thr Arg Thr Arg Ser Ser Arg Leu Leu Ser Leu Lys Gln
    210                 215                 220
Val Ser Pro Arg Ile Pro Ser Gly Asn Tyr Pro Val Ala His Ile Ser
225                 230                 235                 240
Tyr Glu Leu Asn Val Leu Gly Ser Arg Gly Pro Arg Arg Met Gln Cys
                245                 250                 255
Val Met Asp Ala Ile Pro Ala Ser Ala Val Glu Pro Gly Gly Thr Ala
            260                 265                 270
Pro Thr Gln Thr Glu Leu Val His Ser Asn Leu Asp Ser Phe Pro Ser
        275                 280                 285
Phe Ser Phe Phe Arg Ser Lys Ser Ile Arg Ala Glu Ser Leu Pro Ser
    290                 295                 300
Gly Pro Ser Ser Ala Ala Gln Lys Glu Gly Leu Leu Val Leu Lys Asn
305                 310                 315                 320
Lys Ala Pro Arg Trp His Glu Gln Leu Gln Cys Trp Cys Leu Asn Phe
                325                 330                 335
Asn Gly Arg Val Thr Val Ala Ser Val Lys Asn Phe Gln Leu Val Ala
            340                 345                 350
Ala Pro Glu Asn Gly Pro Ala Gly Pro Glu His Glu Asn Val Ile Leu
        355                 360                 365
Gln Phe Gly Lys Val Gly Lys Asp Val Phe Thr Met Asp Tyr Gln Tyr
    370                 375                 380
Pro Ile Ser Ala Phe Gln Ala Phe Thr Ile Cys Leu Ser Ser Phe Asp
385                 390                 395                 400
Thr Lys Ile Ala Cys Glu
                405
```

<210> 4
<211> 265
<212> PRT
<213> Arabidopsis sp.

<400> 4

```
Met Pro Pro Glu Leu Leu Arg Asp Val Leu Met Arg Ile Glu Arg Ser
 1               5                  10                  15
Glu Asp Thr Trp Pro Ser Arg Lys Asn Val Val Ser Cys Val Gly Val
            20                  25                  30
Cys Lys Asn Trp Arg Gln Ile Phe Lys Glu Ile Val Asn Val Pro Glu
        35                  40                  45
Val Ser Ser Lys Phe Thr Phe Pro Ile Ser Leu Lys Gln Pro Gly Pro
    50                  55                  60
Gly Gly Ser Leu Val Gln Cys Tyr Val Lys Arg Asn Arg Ser Asn Gln
65                  70                  75                  80
Thr Phe Tyr Leu Tyr Leu Gly Gly Glu Ala Lys Ile Phe Cys Gln Ser
                85                  90                  95
Glu Pro Ser Asp Ile Tyr Leu Val Pro Tyr Ser Tyr Arg Glu Thr His
            100                 105                 110
Cys Val Met Asp Ala Ile Ser Ala Ser Ala Val Lys Pro Gly Gly Thr
        115                 120                 125
Ala Thr Thr Gln Thr Glu Leu Asp Asn Phe Val Ser Phe Arg Ser Pro
    130                 135                 140
Ser Gly Gln Lys Glu Gly Val Leu Val Leu Lys Ser Lys Val Pro Arg
```

```
145                 150                 155                 160
Leu Glu Glu Gln Ser Trp Cys Leu Asp Phe Asn Gly Ser Pro Glu Asn
                165                 170                 175
Glu Pro Glu Asn Glu Asn Asp Ile Phe Gln Phe Ala Lys Val Gly Asn
            180                 185                 190
Leu His Lys Leu Phe Ser Leu Tyr Glu Ala Glu Trp Ile Pro Leu Val
        195                 200                 205
Arg Thr Ser Val Phe Ala Val Ile Ala Arg Val Cys Arg Asp Lys Lys
    210                 215                 220
His Thr Pro Ser Tyr Glu Leu Lys Leu Ala Leu Tyr Phe Ala Lys Asn
225                 230                 235                 240
Ser Ala Ile Leu Lys Lys Phe Val Leu Arg Gly Tyr Thr Arg Glu Glu
                245                 250                 255
Asp Leu Leu Ala Leu Pro Val Ala Asn
            260                 265
```

<210> 5
<211> 429
<212> PRT
<213> Arabidopsis sp.

<400> 5

```
Met Ser Phe Leu Ser Ile Val Arg Asp Val Arg Asp Thr Val Gly Ser
 1               5                  10                  15
Phe Ser Arg Arg Ser Phe Asp Val Arg Val Ser Asn Gly Thr Thr His
            20                  25                  30
Gln Arg Ser Lys Ser His Gly Val Glu Ala His Ile Glu Asp Leu Ile
        35                  40                  45
Val Ile Lys Asn Thr Arg Trp Ala Asn Leu Pro Ala Ala Leu Leu Arg
    50                  55                  60
Asp Val Met Lys Lys Leu Asp Glu Ser Glu Ser Thr Trp Pro Ala Arg
65                  70                  75                  80
Lys Gln Val Val Ala Cys Ala Gly Val Cys Lys Thr Trp Arg Leu Met
                85                  90                  95
Cys Lys Asp Ile Val Lys Ser Pro Glu Phe Ser Gly Lys Leu Thr Phe
            100                 105                 110
Pro Val Ser Leu Lys Gln Pro Gly Pro Arg Asp Gly Ile Ile Gln Cys
        115                 120                 125
Tyr Ile Lys Arg Asp Lys Ser Asn Met Thr Tyr His Leu Tyr Leu Ser
    130                 135                 140
Leu Ser Pro Ala Ile Leu Val Glu Ser Gly Lys Phe Leu Leu Ser Ala
145                 150                 155                 160
Lys Arg Ser Arg Arg Ala Thr Tyr Thr Glu Tyr Val Ile Ser Met Asp
                165                 170                 175
Ala Asp Asn Ile Ser Arg Ser Ser Ser Thr Tyr Ile Gly Lys Leu Lys
            180                 185                 190
Ser Asn Phe Leu Gly Thr Lys Phe Ile Val Tyr Asp Thr Ala Pro Ala
        195                 200                 205
Tyr Asn Ser Ser Gln Ile Leu Ser Pro Pro Asn Arg Ser Arg Ser Phe
    210                 215                 220
Asn Ser Lys Lys Val Ser Pro Lys Val Pro Ser Gly Ser Tyr Asn Ile
225                 230                 235                 240
Ala Gln Val Thr Tyr Glu Leu Asn Leu Leu Gly Thr Arg Gly Pro Arg
                245                 250                 255
Arg Met Asn Cys Ile Met His Ser Ile Pro Ser Leu Ala Leu Glu Pro
            260                 265                 270
Gly Gly Thr Val Pro Ser Gln Pro Glu Phe Leu Gln Arg Ser Leu Asp
```

```
        275                 280                 285
Glu Ser Phe Arg Ser Ile Gly Ser Ser Lys Ile Val Asn His Ser Gly
    290                 295                 300
Asp Phe Thr Arg Pro Lys Glu Glu Glu Gly Lys Val Arg Pro Leu Val
305                 310                 315                 320
Leu Lys Thr Lys Pro Pro Arg Trp Leu Gln Pro Leu Arg Cys Trp Cys
                325                 330                 335
Leu Asn Phe Lys Gly Arg Val Thr Val Ala Ser Val Lys Asn Phe Gln
            340                 345                 350
Leu Met Ser Ala Ala Thr Val Gln Pro Gly Ser Gly Ser Asp Gly Gly
        355                 360                 365
Ala Leu Ala Thr Arg Pro Ser Leu Ser Pro Gln Gln Pro Glu Gln Ser
    370                 375                 380
Asn His Asp Lys Ile Ile Leu His Phe Gly Lys Val Gly Lys Asp Met
385                 390                 395                 400
Phe Thr Met Asp Tyr Arg Tyr Pro Leu Ser Ala Phe Gln Ala Phe Ala
                405                 410                 415
Ile Ser Leu Ser Thr Phe Asp Thr Lys Leu Ala Cys Glu
            420                 425
```

<210> 6
<211> 388
<212> PRT
<213> Arabidopsis sp.

<400> 6

```
Met Ser Leu Lys Asn Ile Val Lys Asn Lys Tyr Lys Ala Ile Gly Arg
 1               5                  10                  15
Arg Gly Arg Ser His Ile Ala Pro Glu Gly Ser Ser Val Ser Ser Ser
            20                  25                  30
Leu Ser Thr Asn Glu Gly Leu Asn Gln Ser Ile Trp Val Asp Leu Pro
        35                  40                  45
Pro Glu Leu Leu Leu Asp Ile Ile Gln Arg Ile Glu Ser Glu Gln Ser
    50                  55                  60
Leu Trp Pro Gly Arg Arg Asp Val Val Ala Cys Ala Ser Val Cys Lys
65                  70                  75                  80
Ser Trp Arg Glu Met Thr Lys Glu Val Val Lys Val Pro Glu Leu Ser
                85                  90                  95
Gly Leu Ile Thr Phe Pro Ile Ser Leu Arg Gln Pro Gly Pro Arg Asp
            100                 105                 110
Ala Pro Ile Gln Cys Phe Ile Lys Arg Glu Arg Ala Thr Gly Ile Tyr
        115                 120                 125
Arg Leu Tyr Leu Gly Leu Ser Pro Ala Leu Ser Gly Asp Lys Ser Lys
    130                 135                 140
Leu Leu Leu Ser Ala Lys Arg Val Arg Arg Ala Thr Gly Ala Glu Phe
145                 150                 155                 160
Val Val Ser Leu Ser Gly Asn Asp Phe Ser Arg Ser Ser Ser Asn Tyr
                165                 170                 175
Ile Gly Lys Leu Arg Ser Asn Phe Leu Gly Thr Lys Phe Thr Val Tyr
            180                 185                 190
Glu Asn Gln Pro Pro Pro Phe Asn Arg Lys Leu Pro Pro Ser Met Gln
        195                 200                 205
Val Ser Pro Trp Val Ser Ser Ser Ser Ser Ser Tyr Asn Ile Ala Ser
    210                 215                 220
Ile Leu Tyr Glu Leu Asn Val Leu Arg Thr Arg Gly Pro Arg Arg Met
225                 230                 235                 240
Gln Cys Ile Met His Ser Ile Pro Ile Ser Ala Ile Gln Glu Gly Gly
```

```
                245                 250                 255
Lys Ile Gln Ser Pro Thr Glu Phe Thr Asn Gln Gly Lys Lys Lys Lys
            260                 265                 270
Lys Pro Leu Met Asp Phe Cys Ser Gly Asn Leu Gly Gly Glu Ser Val
        275                 280                 285
Ile Lys Glu Pro Leu Ile Leu Lys Asn Lys Ser Pro Arg Trp His Glu
    290                 295                 300
Gln Leu Gln Cys Trp Cys Leu Asn Phe Lys Gly Arg Val Thr Val Ala
305                 310                 315                 320
Ser Val Lys Asn Phe Gln Leu Val Ala Ala Ala Ala Glu Ala Gly Lys
                325                 330                 335
Asn Met Asn Ile Pro Glu Glu Glu Gln Asp Arg Val Ile Leu Gln Phe
            340                 345                 350
Gly Lys Ile Gly Lys Asp Ile Phe Thr Met Asp Tyr Arg Tyr Pro Ile
        355                 360                 365
Ser Ala Phe Gln Ala Phe Ala Ile Cys Leu Ser Ser Phe Asp Thr Lys
    370                 375                 380
Pro Val Cys Glu
385
```

<210> 7
<211> 379
<212> PRT
<213> Arabidopsis sp.

<400> 7

```
Met Pro Leu Ser Arg Ser Leu Leu Ser Arg Arg Ile Ser Asn Ser Phe
 1               5                  10                  15
Arg Phe His Gln Gly Glu Thr Thr Thr Ala Pro Glu Ser Glu Ser Ile
            20                  25                  30
Pro Pro Pro Ser Asn Met Ala Gly Ser Ser Ser Trp Ser Ala Met Leu
        35                  40                  45
Pro Glu Leu Leu Gly Glu Ile Ile Arg Arg Val Glu Glu Thr Glu Asp
    50                  55                  60
Arg Trp Pro Gln Arg Arg Asp Val Val Thr Cys Ala Cys Val Ser Lys
65                  70                  75                  80
Lys Trp Arg Glu Ile Thr His Asp Phe Ala Arg Ser Ser Leu Asn Ser
                85                  90                  95
Gly Lys Ile Thr Phe Pro Ser Cys Leu Lys Leu Pro Gly Pro Arg Asp
            100                 105                 110
Phe Ser Asn Gln Cys Leu Ile Lys Arg Asn Lys Lys Thr Ser Thr Phe
        115                 120                 125
Tyr Leu Tyr Leu Ala Leu Thr Pro Ser Phe Thr Asp Lys Gly Lys Phe
    130                 135                 140
Leu Leu Ala Ala Arg Arg Phe Arg Thr Gly Ala Tyr Thr Glu Tyr Ile
145                 150                 155                 160
Ile Ser Leu Asp Ala Asp Asp Phe Ser Gln Gly Ser Asn Ala Tyr Val
                165                 170                 175
Gly Lys Leu Arg Ser Asp Phe Leu Gly Thr Asn Phe Thr Val Tyr Asp
            180                 185                 190
Ser Gln Pro Pro His Asn Gly Ala Lys Pro Ser Asn Gly Lys Ala Ser
        195                 200                 205
Arg Arg Phe Ala Ser Lys Gln Ile Ser Pro Gln Val Pro Ala Gly Asn
    210                 215                 220
Phe Glu Val Gly His Val Ser Tyr Lys Phe Asn Leu Leu Lys Ser Arg
225                 230                 235                 240
Gly Pro Arg Arg Met Val Ser Thr Leu Arg Cys Pro Ser Pro Ser Pro
```

```
                245                 250                 255
Ser Ser Ser Ser Ala Gly Leu Ser Ser Asp Gln Lys Pro Cys Asp Val
            260                 265                 270
Thr Lys Ile Met Lys Lys Pro Asn Lys Asp Gly Ser Ser Leu Thr Ile
        275                 280                 285
Leu Lys Asn Lys Ala Pro Arg Trp His Glu His Leu Gln Cys Trp Cys
    290                 295                 300
Leu Asn Phe His Gly Arg Val Thr Val Ala Ser Val Lys Asn Phe Gln
305                 310                 315                 320
Leu Val Ala Thr Val Asp Gln Ser Gln Pro Ser Gly Lys Gly Asp Glu
                325                 330                 335
Glu Thr Val Leu Leu Gln Phe Gly Lys Val Gly Asp Asp Thr Phe Thr
            340                 345                 350
Met Asp Tyr Arg Gln Pro Leu Ser Ala Phe Gln Ala Phe Ala Ile Cys
        355                 360                 365
Leu Thr Ser Phe Gly Thr Lys Leu Ala Cys Glu
    370                 375
```

<210> 8
<211> 397
<212> PRT
<213> Arabidopsis sp.

<400> 8

```
Met Ala Gly Ser Arg Lys Val Asn Asp Leu Leu Glu Glu Asn Lys Gly
 1               5                  10                  15
Asn Val Asp Thr Ile Thr Gly Ser Leu Ser Thr Gln Lys Gly Glu Asp
            20                  25                  30
Lys Glu Asn Val Ser Pro Glu Lys Val Ser Thr Ser Val Glu Thr Arg
        35                  40                  45
Lys Leu Asp Arg Ala Leu Lys Ser Gln Ser Met Lys Gly Asn Ser Gly
    50                  55                  60
Phe Pro Thr Glu Val Thr Asn Phe Lys Ser Phe Ser Thr Gly Gly Arg
65                  70                  75                  80
Thr Ala Leu Lys Gln Ser Ser Leu Gln Ala Cys Met Gln Lys Asn Ser
                85                  90                  95
Glu Val Asp Lys Ser Ser Phe Gly Met Lys Thr Trp Thr Ser Val Asp
            100                 105                 110
Ser Glu His Ser Ser Ser Leu Lys Val Trp Glu Phe Ser Asp Ser Glu
        115                 120                 125
Ala Ala Pro Ala Ser Ser Trp Ser Thr Leu Pro Asn Arg Ala Leu Leu
    130                 135                 140
Cys Lys Thr Leu Pro Leu Asp Val Gly Arg Cys Thr Cys Leu Ile Val
145                 150                 155                 160
Lys Glu Gln Ser Pro Glu Gly Leu Ser His Gly Ser Val Tyr Ser Leu
                165                 170                 175
Tyr Thr His Glu Gly Arg Gly Arg Lys Asp Arg Lys Leu Ala Val Ala
            180                 185                 190
Tyr His Ser Arg Arg Asn Gly Lys Ser Ile Phe Arg Val Ala Gln Asn
        195                 200                 205
Val Lys Gly Leu Leu Cys Ser Ser Asp Glu Ser Tyr Val Gly Ser Met
    210                 215                 220
Thr Ala Asn Leu Leu Gly Ser Lys Tyr Tyr Ile Trp Asp Lys Gly Val
225                 230                 235                 240
Arg Val Gly Ser Val Gly Lys Met Val Lys Pro Leu Leu Ser Val Val
                245                 250                 255
Ile Phe Thr Pro Thr Ile Thr Thr Trp Thr Gly Ser Tyr Arg Arg Met
```

```
            260                 265                 270
Arg Thr Leu Leu Pro Lys Gln Gln Pro Met Gln Lys Asn Asn Asn Lys
        275                 280                 285
Gln Val Gln Gln Ala Ser Lys Leu Pro Leu Asp Trp Leu Glu Asn Lys
    290                 295                 300
Glu Lys Ile Gln Lys Leu Cys Ser Arg Ile Pro His Tyr Asn Lys Ile
305                 310                 315                 320
Ser Lys Gln His Glu Leu Asp Phe Arg Asp Arg Gly Arg Thr Gly Leu
                325                 330                 335
Arg Ile Gln Ser Ser Val Lys Asn Phe Gln Leu Thr Leu Thr Glu Thr
            340                 345                 350
Pro Arg Gln Thr Ile Leu Gln Met Gly Arg Val Asp Lys Ala Arg Tyr
        355                 360                 365
Val Ile Asp Phe Arg Tyr Pro Phe Ser Gly Tyr Gln Ala Phe Cys Ile
    370                 375                 380
Cys Leu Ala Ser Ile Asp Ser Lys Leu Cys Cys Thr Val
385                 390                 395

<210> 9
<211> 380
<212> PRT
<213> Arabidopsis sp.

<400> 9
Met Thr Phe Arg Ser Leu Leu Gln Glu Met Arg Ser Arg Pro His Arg
 1               5                  10                  15
Val Val His Ala Ala Ala Ser Thr Ala Asn Ser Ser Asp Pro Phe Ser
            20                  25                  30
Trp Ser Glu Leu Pro Glu Glu Leu Leu Arg Glu Ile Leu Ile Arg Val
        35                  40                  45
Glu Thr Val Asp Gly Gly Asp Trp Pro Ser Arg Arg Asn Val Val Ala
    50                  55                  60
Cys Ala Gly Val Cys Arg Ser Trp Arg Ile Leu Thr Lys Glu Ile Val
65                  70                  75                  80
Ala Val Pro Glu Phe Ser Ser Lys Leu Thr Phe Pro Ile Ser Leu Lys
                85                  90                  95
Gln Ser Gly Pro Arg Asp Ser Leu Val Gln Cys Phe Ile Lys Arg Asn
            100                 105                 110
Arg Asn Thr Gln Ser Tyr His Leu Tyr Leu Gly Leu Thr Thr Ser Leu
        115                 120                 125
Thr Asp Asn Gly Lys Phe Leu Leu Ala Ala Ser Lys Leu Lys Arg Ala
    130                 135                 140
Thr Cys Thr Asp Tyr Ile Ile Ser Leu Arg Ser Asp Asp Ile Ser Lys
145                 150                 155                 160
Arg Ser Asn Ala Tyr Leu Gly Arg Met Arg Ser Asn Phe Leu Gly Thr
                165                 170                 175
Lys Phe Thr Val Phe Asp Gly Ser Gln Thr Gly Ala Ala Lys Met Gln
            180                 185                 190
Lys Ser Arg Ser Ser Asn Phe Ile Lys Val Ser Pro Arg Val Pro Gln
        195                 200                 205
Gly Ser Tyr Pro Ile Ala His Ile Ser Tyr Glu Leu Asn Val Leu Gly
    210                 215                 220
Ser Arg Gly Pro Arg Arg Met Arg Cys Ile Met Asp Thr Ile Pro Met
225                 230                 235                 240
Ser Ile Val Glu Ser Arg Gly Val Val Ala Ser Thr Ser Ile Ser Ser
                245                 250                 255
Phe Ser Ser Arg Ser Ser Pro Val Phe Arg Ser His Ser Lys Pro Leu
```

```
            260                 265                 270
Arg Ser Asn Ser Ala Ser Cys Ser Asp Ser Gly Asn Asn Leu Gly Asp
        275                 280                 285
Pro Pro Leu Val Leu Ser Asn Lys Ala Pro Arg Trp His Glu Gln Leu
    290                 295                 300
Arg Cys Trp Cys Leu Asn Phe His Gly Arg Val Thr Val Ala Ser Val
305                 310                 315                 320
Lys Asn Phe Gln Leu Val Ala Val Ser Asp Cys Glu Ala Gly Gln Thr
                325                 330                 335
Ser Glu Arg Ile Ile Leu Gln Phe Gly Lys Val Gly Lys Asp Met Phe
            340                 345                 350
Thr Met Asp Tyr Gly Tyr Pro Ile Ser Ala Phe Gln Ala Phe Ala Ile
        355                 360                 365
Cys Leu Ser Ser Phe Glu Thr Arg Ile Ala Cys Glu
    370                 375                 380
```

<210> 10
<211> 445
<212> PRT
<213> Arabidopsis sp.

<400> 10

```
Met Ser Phe Arg Gly Ile Val Gln Asp Leu Arg Asp Gly Phe Gly Ser
 1               5                  10                  15
Leu Ser Arg Arg Ser Phe Asp Phe Arg Leu Ser Ser Leu His Lys Gly
            20                  25                  30
Lys Ala Gln Gly Ser Ser Phe Arg Glu Tyr Ser Ser Ser Arg Asp Leu
        35                  40                  45
Leu Ser Pro Val Ile Val Gln Thr Ser Arg Trp Ala Asn Leu Pro Pro
    50                  55                  60
Glu Leu Leu Phe Asp Val Ile Lys Arg Leu Glu Glu Ser Glu Ser Asn
65                  70                  75                  80
Trp Pro Ala Arg Lys His Val Val Ala Cys Ala Ser Val Cys Arg Ser
                85                  90                  95
Trp Arg Ala Met Cys Gln Glu Ile Val Leu Gly Pro Glu Ile Cys Gly
            100                 105                 110
Lys Leu Thr Phe Pro Val Ser Leu Lys Gln Pro Gly Pro Arg Asp Ala
        115                 120                 125
Met Ile Gln Cys Phe Ile Lys Arg Asp Lys Ser Lys Leu Thr Phe His
    130                 135                 140
Leu Phe Leu Cys Leu Ser Pro Ala Leu Leu Val Glu Asn Gly Lys Phe
145                 150                 155                 160
Leu Leu Ser Ala Lys Arg Thr Arg Arg Thr Thr Arg Thr Glu Tyr Ile
                165                 170                 175
Ile Ser Met Asp Ala Asp Asn Ile Ser Arg Ser Ser Asn Ser Tyr Leu
            180                 185                 190
Gly Lys Leu Arg Ser Asn Phe Leu Gly Thr Lys Phe Leu Val Tyr Asp
        195                 200                 205
Thr Gln Pro Pro Pro Asn Thr Ser Ser Ser Ala Leu Ile Thr Asp Arg
    210                 215                 220
Thr Ser Arg Ser Arg Phe His Ser Arg Arg Val Ser Pro Lys Val Pro
225                 230                 235                 240
Ser Gly Ser Tyr Asn Ile Ala Gln Ile Thr Tyr Glu Leu Asn Val Leu
                245                 250                 255
Gly Thr Arg Gly Pro Arg Arg Met His Cys Ile Met Asn Ser Ile Pro
            260                 265                 270
Ile Ser Ser Leu Glu Pro Gly Gly Ser Val Pro Asn Gln Pro Glu Lys
```

```
        275                 280                 285
Leu Val Pro Ala Pro Tyr Ser Leu Asp Asp Ser Phe Arg Ser Asn Ile
    290                 295                 300
Ser Phe Ser Lys Ser Ser Phe Asp His Arg Ser Leu Asp Phe Ser Ser
305                 310                 315                 320
Ser Arg Phe Ser Glu Met Gly Ile Ser Cys Asp Asp Asn Glu Glu Glu
                325                 330                 335
Ala Ser Phe Arg Pro Leu Ile Leu Lys Asn Lys Gln Pro Arg Trp His
            340                 345                 350
Glu Gln Leu Gln Cys Trp Cys Leu Asn Phe Arg Gly Arg Val Thr Val
        355                 360                 365
Ala Ser Val Lys Asn Phe Gln Leu Val Ala Ala Arg Gln Pro Gln Pro
    370                 375                 380
Gln Gly Thr Gly Ala Ala Ala Ala Pro Thr Ser Ala Pro Ala His Pro
385                 390                 395                 400
Glu Gln Asp Lys Val Ile Leu Gln Phe Gly Lys Val Gly Lys Asp Met
                405                 410                 415
Phe Thr Met Asp Tyr Arg Tyr Pro Leu Ser Ala Phe Gln Ala Phe Ala
            420                 425                 430
Ile Cys Leu Ser Ser Phe Asp Thr Lys Leu Ala Cys Glu
        435                 440                 445
```

<210> 11
<211> 380
<212> PRT
<213> Arabidopsis sp.

<400> 11

```
Met Arg Ser Arg Pro His Arg Val Val His Asp Leu Ala Ala Ala Ala
 1               5                  10                  15
Ala Ala Asp Ser Thr Ser Val Ser Ser Gln Asp Tyr Arg Trp Ser Glu
            20                  25                  30
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Val Cys Arg Gly Trp Arg Leu Leu Met Asn Glu Thr Val Val Val Pro
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Glu Ile Ser Ser Lys Leu Thr Phe Pro Ile Ser Leu Lys Gln Pro Gly
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Pro Arg Asp Ser Leu Val Gln Cys Phe Ile Lys Arg Asn Arg Ile Thr
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Gln Ser Tyr His Leu Tyr Leu Gly Leu Thr Asn Ser Leu Thr Asp Asp
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Gly Lys Phe Leu Leu Ala Ala Cys Lys Leu Lys His Thr Thr Cys Thr
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Asp Tyr Ile Ile Ser Leu Arg Ser Asp Asp Met Ser Arg Arg Ser Gln
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Ala Tyr Val Gly Lys Val Arg Ser Asn Phe Leu Gly Thr Lys Phe Thr
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Val Phe Asp Gly Asn Leu Leu Pro Ser Thr Gly Ala Ala Lys Leu Arg
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Lys Ser Arg Ser Tyr Asn Pro Ala Lys Val Ser Ala Lys Val Pro Leu
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Arg Ser Ser Ser Ser His Leu Lys Glu Thr Pro Leu Val Leu Ser Asn
        275                 280                 285
Lys Thr Pro Arg Trp His Glu Gln Leu Arg Cys Trp Cys Leu Asn Phe
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Ala Gly Ala Ser Cys Gly Ser Gly Thr Gly Met Ser Pro Glu Arg Gln
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Ser Glu Arg Ile Ile Leu Gln Phe Gly Lys Val Gly Lys Asp Met Phe
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